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ABSTRACT

The present study was conducted to investigate the effects of peer collaboration and individual study as modes of practice, using the lesson content of a required introductory accounting course. The study also examined the effects of using content organizers on the practice worksheets. Data were analyzed using a 2 x 2 analysis of variance comparing posttest performance across practice modes (peer collaboration and individual) and content organizer treatments (organizers versus no organizers). Data from the attitude questionnaire were analyzed for variations in responses between the peer collaboration and individual work groups. Students showed a significantly higher level of achievement using the practice mode of peer collaboration, as well as having significantly more positive attitudes towards this method of classroom practice in problem solving. Several factors may have contributed to the positive results for peer collaboration. These include providing and explaining the answer, obtaining feedback and discussion, and playing an active role in learning. (Contains 8 references.) (Author)

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Title:

Student Performance and Attitudes Using Peer Collaboration in Accounting

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STUDENT PERFORMANCE AND ATTITUDES USING PEER COLLABORATION IN ACCOUNTING

ABSTRACT

Purpose

The present study was conducted to investigate the effects of peer collaboration and individual study as modes of practice, using the lesson content of a required introductory accounting course. The study also examined the effects of using content organizers on the practice worksheets.

Method

Data were analyzed using a 2 x 2 analysis of variance comparing posttest performance across practice modes (peer collaboration and individual) and content organizer treatments (organizers versus no organizers). Data from the attitude questionnaire were analyzed for variations in responses between the peer collaboration and individual-work groups.

Results

Students showed a significantly higher level of achievement using the practice mode of peer collaboration, as well as having significantly more positive attitudes towards this method of classroom practice in problem solving.
Several factors may have contributed to the positive results for peer collaboration. These include providing and explaining the answer, obtaining feedback and discussion, and playing an active role in learning.

The study of accounting lends itself well to group review as part of the learning process. Even the accounting profession depends on peer review and peer consulting to strengthen the validity and accuracy of individual work. In recent years, the profession has been vocal in its concern that higher education, while providing technically educated graduates, must also help develop the intellectual, interpersonal and communication skills of accounting majors. Patten and Williams (1990) summarized the key issues that require a "thorough re-examination of the total accounting experience," citing increased communication and interpersonal skills as two key issues.

Cooperative learning among students is becoming increasingly popular in educational settings. Slavin (1987) defines cooperative learning as having four components of 1)group task, 2)incentive, 3)motive and 4)behavior. Group work is deemed to be cooperative if the students work on a common assignment (group task); have an interdependent reason to work together (incentive); want to work together (motive); and work as a team (behavior) (Hooper, in press).

Cooperative learning methods are usually based on one of two major theories, developmental and motivational. Developmental theory holds that the interaction of the group itself leads to improved achievement, whereas motivational theory says achievement depends on the goal/reward structure (Slavin, 1987). The reward structure in developmental theory appears more intrinsic whereas the reward structure in motivational theory is more extrinsic. Most empirical findings support the reward structure of motivational theory, but Slavin suggests combining and reconciling both theories to provide the strongest results.

The area of applied accounting content, such as found in introductory accounting classes, may provide a particularly good environment and educational setting for using peer collaboration. Students often have difficulty in accounting and are frequently uncertain about their answers to applied problems. Peer collaboration could provide a second opinion of their work, similar to what practioners use. It could also give the students an opportunity to discuss and elaborate on both the accounting content and the problem methodology.

Peer collaboration, as a type of cooperative learning, may provide a link between these two types of reward structures. The ability to explain or defend an answer to a peer may increase comprehension and correct misconceptions. These results could lead to improved learning and could also provide both intrinsic and extrinsic rewards for the students.

The ability to organize new information and extract the key steps or rules may improve performance (Ellis, et al, 1986). Tessmer, et al (1990) proposed an approach to teaching and learning concepts that would include demonstrating to the students a way to arrange or think about new materials. Accounting education has also attempted to help students organize the concepts into important ideas or "rules", to facilitate both recall and application of the materials. Often, these content organizers are verbally expounded by the instructor, but they may or may not be used by the student in solving the accounting problems.

The present study was conducted to investigate the effects of peer collaboration and individual study as modes of practice, using the lesson content of a required introductory accounting course. The study also examined the effects of using

content organizers on the practice worksheets.

The three primary research questions were:

1. Which is the more effective method of practice.individual practice or peer collaboration, in solving accounting problems?
2. Does the use of content organizers with practice worksheets increase learning?
3. What are the effects of peer collaboration and individual practice methods on student attitudes?

METHOD

Subjects

The subjects in the study were 211 college students (sophomores, juniors, and seniors) enrolled in the first semester of Introductory Accounting at a large southwestern university. The Introductory Accounting classes are prerequisites for entry into many of the professional programs in the College of Business (Accounting, Marketing, Management, Computer Information Systems, and General Business).

Procedures

The study was conducted using a 2 (individual/peer collaboration) X 2 (organizers/no organizers) design. This resulted in four separate treatment groups: Peer collaboration with content organizers, peer collaboration without content organizers, individual practice with content organizers, and individual practice without content organizers. Students attended their scheduled classes and each class time-block was randomly assigned to a treatment.

At the break-out session before the study and on first day of the study, the students were given the following information by their instructors:

> Our class has been selected to participate in a study that will look at the differences between individual and group practice . In order to have reliable results, it is critical for you to attend all three classes. You will receive 10 points for attending all three classes. But it is an all or nothing reward. If you miss even one of the classes, you cannot receive any points. ADDITIONALLY, the quiz on Friday will be worth 10 points.

All the students attended the same weekly mass lecture on Wednesdays, but were assigned to different break-out sessions that met on Mondays and Fridays. The break-out sections were taught by graduate teaching assistants and ranged in size from 25 to 45 students per session. The study ran during three 50 minute class periods, with the posttest being administered in the third class period.

During each class the teaching assistant lectured and used the worksheet problems throughout the lecture to illustrate the concepts being presented, as well as to provide practice for the students. The teaching assistant verbally provided content organizers as part of the class discussion that preceded practice in all groups. The researcher and teaching assistants had agreed upon the organizers to use on the worksheets, which were the same ones used most frequently by the teaching assistants in their lectures (E.g.,"Remember that debits equal credits; The accounting equation requires that assets equal liabilities and owners equity."). All students individually worked the practice problems before the teaching assistant lead the class in discussing and answering the problems.

In the peer collaboration groups, the individual work was followed by comparisons of answers between student partners. The students worked in self-selected teams of two. The teaching assistant gave the students instructions to "Work out your own solution and then consult with your partner". Each student spent about a minute

working out his or her own solution to each problem and then about a minute collaborating on the answer. Each student had his or her own worksheet.

In the individual practice treatments, the students worked on their problems by themselves for about two minutes. In all the treatment groups, the teaching assistant lead a discussion and answer process of solving the practice problem after the students had worked on a solution.

The content organizers were listed and circled in the margins of the worksheets used by the Content Organizer groups (eg., DR = CR; A = L + OE). The teaching assistant verbally included the organizers in both the lecture and the discussion sections for all the classes. The written organizers were not included on any of the worksheets on the last day of treatment. This change was made so that the group using the organizers would also receive practice without the organizers, since the test did not include any prompts.

Materials

Materials consisted of the required accounting textbook for the course, overhead transparencies prepared by the two teaching assistants, and the experimental practice worksheets. The teaching assistants met with the researcher prior to the study and reviewed the content, structure and wording of the practice worksheets. Each teaching assistant used overhead transparencies which they individually prepared by summarizing key content points from the textbook. The content and presentation of the overheads were comparable. The practice worksheet problems were based on homework problems from the textbook.

Criterion Measures

Results were measured by a 40 item posttest, administered on the last day of treatment. The tests were scored by the researcher, who is an experienced accounting instructor and a CPA. The test covered the content of the accounting lessons taught during the study. The K-R 21 reliability for the posttest was .89, indicating high reliability of measurement. The teaching assistants converted the 40 item posttest into a quiz score of one to ten points, consistent with their weekly pattern of ten-point quizzes. The test contributed to the student's grades as one of 12 quizzes given throughout the semester.

Students also completed a 12-item Likert-type attitude survey, scored from 1 (Strongly Agree) to 5 (Strongly Disagree). The survey also contained two open-ended questions.

Design and Data Analysis

The research design was a 2 X 2 posttest-only factorial design. Data were analyzed using a 2 x 2 analysis of variance comparing posttest performance across practice modes (peer collaboration and individual) and content organizer treatments (organizers versus no organizers). Data from the attitude questionnaire were analyzed for variations in responses between the peer collaboration and individual-work groups.

RESULTS

Table 1 shows mean scores were 27.3 for peer collaboration and 23.2 for individual practice. The difference in favor of peer collaboration was statistically significant, $F(2, 167) = 5.12$, $p < .007$.

Insert Table 1 here.

As shown in Table 1, mean scores for the content organizers and no content organizers were 27.8 and 25.2, respectively. This difference approached, but did not reach, the .05 level of significance, $F(2, 167) = 3.53$, $p < .062$. The interaction was not significant for practice mode by content organizers.

Four significant differences between practice modes were found in student attitudes. Students in peer collaboration groups (mean = 2.07) responded significantly more favorably to the question "Do you think it helps you understand accounting to consult with a partner?" than did students in individual treatment groups (mean = 2.68). When asked "Do you think it helps you learn more if you explain your answer to another student?" students in peer collaboration (mean = 1.88) responded significantly more favorably than did students in individual treatment groups (mean = 2.54). The reaction by students in peer collaboration was significantly more favorable to the question "By using the practice worksheets, did you find it easier to understand your TA's lecture?" (means = 1.98 and 2.41, respectively). However, students in individual treatment groups (mean = 3.83) responded with significantly stronger disagreement to the question "Did using the practice worksheets take away time that should have been used for your TA's lecture?" than the peer collaboration groups (mean = 3.39).

The student comments on the two open-ended questions yielded some common

themes. The first question asked the students "What three changes would you make to Introductory Accounting to make it easier to understand?". The most common answers were 1) More time in class , 2) Less content coverage ("goes too fast" or "slow it down"), and 3) Cover materials/concepts before homework is assigned or due. The second question asked for student comments and reactions to the research study. Many students commented that the research was a "good idea" and "talking about it made class more interesting". Students remarked that the worksheets were helpful, as was working with a "partner", because "Two heads are better than one" and "It helps to talk about it and correct your own mistakes."

At the end of class on the last day of treatment, students were invited to attend a de-briefing session to discuss the study. A total of 40 students attended the session on their own time and participated very actively in sharing their attitudes about the method of peer collaboration. By a show of hands vote,they overwhelmingly endorsed the method (37 to 3). Group consensus focused on three changes to improve the classroom application of the study. Students felt the teaching assistant should assign the teams, rather than allowing the students to choose. They also thought more time should be allowed to consult on the answers. Students recommended that time be spent in class for training and instruction in group work prior to working in teams.

DISCUSSION

The significant differences in achievement by the peer collaboration group that were obtained in this study, combined with the positive attitude findings, are encouraging for additional work with peer collaboration. Several factors may have contributed to the positive results for peer collaboration. These include providing

and explaining the answer, obtaining feedback and discussion, and playing an active role in learning.

Students working with partners interacted by giving and explaining their answer, as well as by receiving their partner's answer. This kind of interaction may also provide a experience necessary for developing the kinds of consultative skills needed in the accounting profession. The peer collaboration practice mode may have provided the possibility for further processing of information. Kulhavy, et al (1988) found that greater time spent encoding information into working memory results in deeper processing and, in turn, better recall of information. The peer collaboration mode certainly offered the opportunity for more active processing of information, which could have led to better recall by the peer collaboration group.

Another important aspect of the study is the possible power of collaboration after working alone. Students initially worked alone and then consulted with their partner. This form of peer collaboration or consulting combines individual learning with group interaction, which may have more application to the business world which the students plan to enter. Patten and Doyle (1990) urge accounting educators to fashion the accounting education experience to include more situations where students learn to work together.

Learning to collaborate may also provide the learner with a greater sense of active participation in the subject matter. The aspect of being engaged in the class activities is increased when student interaction can be fostered (Webb and Cullian, 1983). In many accounting courses, the pace of content coverage is deemed to be too fast by the students, but they are hesitant to say so in class. However, once the

students are more actively involved in peer collaboration, they are also more willing to ask questions of the instructor.

A good by-product of active learning may be a more positive attitude towards learning, on the part of both instructor and student. Positive attitudes from this study appeared to encourage more student involvement and participation during class discussions. Students felt they learned more by working together in class, which might also provide more relevance and confidence to students. Peer collaboration may provide a source of continuing motivation for the students.

The teaching assistants also felt the use of peer groups increased their enjoyment of teaching. Both teaching assistants continued to use the peer collaboration practice mode throughout the rest of the semester, and received positive student feedback on it on the student evaluations at the end of the semester.

Based on the results from this study and due to the major curriculum changes being made in the School of Accountancy, peer collaboration is now being included as a standard class practice method, with much success. The new introductory courses will have the majority of all class activities conducted as collaborative work. Additionally, the use of peer collaboration is being investigated for the new computer lab course.

The content organizers on the practice worksheets did not result in a statistically significant difference, although the difference did approach significance. Whether such an approach is effective is still unclear. Perhaps if students had been trained in how to use the organizers, a stronger effect may have occurred. Ellis, et al

(1986) distinguish between specific and generic organizers and suggest that more structured instruction is needed for the learners to effectively use content organizers.

The content in a number of subjects involving applied skills often lends itself well to a peer collaboration method. For example, mathematics, statistics, lab sciences, even spelling, could use this method for class practice. The results of this study suggest peer collaboration is effective in producing a higher level of learning and appealing to the students. Students showed higher levels of achievement under peer collaboration and they had significantly more positive attitudes toward this practice mode.

Classroom application and research study continue to increase in the area of cooperative learning. The present study raises questions that are appropriate for further investigation in peer collaboration. Does peer collaboration work better when more time is allowed for the consulting phase of practice? Is peer collaboration or consulting a way to combine individual accountability and team work, thus simulating the working situations many accounting students will encounter upon graduation? Would training in the most effective ways to work with a partner increase the learning benefits?

The results from this study indicate that peer collaboration is an effective method for use in the technical areas of accounting. Further research and applied study using peer collaboration can help us to understand its most effective uses to improve accounting instruction.

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TABLE 1

Test Mean Scores and Standard Deviation by Treatment

CONTENT ORGANIZERS	PRACTICE MODE Peer	Individual	Totals
Organizers			
M	28.5	24.4	27.8
S	7.6	6.6	
No Organizers			
M	26.0	22.4	25.2
S	8.3	10.2	
Mean Totals	27.3	23.2	26.5